MEEKS

DAM SAFETY INSPECTION REPORT

Margaret Creek Structure No. 1
File Number: 9121-008
Class I
Athens County, Alexander Township
Inspection Date: May 23, 2007

In accordance with Ohio Revised Code Section 1521.062, the owners of dams must monitor, maintain, and operate their dams safely. Negligence of owners in fulfilling these responsibilities can lead to the development of extremely hazardous conditions to downstream residents and properties. In the event of a dam failure, owners can be subject to liability claims.

The Chief of the Division of Water has the responsibility to ensure that human life, health, and property are protected from the failure of dams. Conducting periodic safety inspections and working with dam owners to maintain and improve the overall condition of Ohio dams are vital aspects of achieving this purpose.

Representatives of the Chief conducted this inspection to evaluate the condition of the dam and its appurtenances under authority of Ohio Revised Code Section 1521.062. In accordance with Ohio Administrative Code Rule 1501:21-21-03, the owners of dams must implement all remedial measures listed in the enclosed report.

Table of Contents

Section 1

Required Remedial Measures

The requirements listed below are based on observations made during inspection, calculations performed, and requirements of the Ohio Administrative Code (OAC). A checklist noting all observations made during the inspection has been enclosed in Section 3. References to right and left in this report are oriented as if you were standing on the dam crest and looking downstream.

Engineer Repairs and Investigations: The owner must retain the services of a professional engineer to address the following items. Plans, specifications, investigative reports, and other supporting documentation, as necessary, must be submitted to the Division of Water for review and approval prior to construction. These items have been noted previously and the appropriate time period for completion has already been exceeded. A record of all repairs should be included in the operation, maintenance, and inspection manual.

1. The dam's discharge/storage capacity must be sufficient to safely pass the required design flood. Perform a hydrologic and hydraulic study to determine the adequacy of the dam's discharge/storage capacity to safely pass the required design flood. Prepare plans and specifications as necessary to increase the discharge/storage capacity to pass the required design flood. In accordance with OAC Rule 1501:21-13-02, the minimum design flood for Class I dams is 100 percent of the Probable Maximum Flood or the critical flood. See the Flood Routing Summary in Section 2 of this report for additional information.

Owner Repairs: The owner must address the following items. The owner may hire a contractor or perform the work him or herself. Repair activities should be documented in the operation, maintenance, and inspection manual.

1. Mow all vegetation on the embankment and in the emergency spillway at least twice per year. See the "Ground Cover" fact sheet included in this section for additional information.

2. Remove the vegetation from the concrete slabs adjacent to the stilling basin. See the "Trees and Brush" fact sheet included in this section for additional information.

3. Perform routine maintenance on the toe drains including clearing the pipe outlets. See the "Seepage Through Earthen Dams" fact sheet included in this section for additional information.

Owner Dam Safety Program: In accordance with Ohio Revised Code (ORC) Section 1521.062, the owner of a dam shall maintain a safe structure and appurtenances through inspection, maintenance, and operation. A dam, like any other part of the infrastructure, will change and deteriorate over time. Appurtenances such as gates and valves must be routinely exercised to ensure their operability. Inspection and monitoring of the dam identifies changing conditions and problems as they develop, and maintenance prevents minor problems from developing into major ones. Dams must have these procedures documented in an operation, maintenance, and inspection manual (OMI).

Despite efforts to provide sufficient structural integrity and to perform inspection and maintenance, dams can develop problems that can lead to failure. Early detection and appropriate response are crucial for

maintaining the safety of the dam and downstream people and property. The ORC requires the owner to fully and promptly notify the Division of Water of any condition which threatens the safety of the structure. A rapidly changing condition may be an indication of a potentially dangerous problem. The Dam Safety Engineering Program can be contacted at 614/265-6731 during business hours or at 614/799-9538 after business hours. Dams must have emergency preparedness procedures documented in an emergency action plan (EAP).

The owner must address the following items.

1. The Emergency Action Plan must be updated to address items 2 and 3 in the Division of Water letter of April 4, 2003. A copy of the letter is included in this section. The inundation maps are sufficient for now, but will need to be updated when the hydraulics and hydrology are addressed or if more downstream development occurs (likely within 10 years). Item 4 of the letter has been addressed.

2. This dam must have an operation, maintenance, and inspection manual (OMI) in accordance with OAC Rule 1501:21-21-04. Prepare and submit an OMI manual. In general, your current procedures and checklists are acceptable. Guidelines for the preparation of an OMI manual are included with this report.

3. Monitor the flow exiting the toe drains monthly for any signs of increased flow, muddy flow, or instability on or adjacent to the embankment. See the "Seepage Through Earthen Dams" fact sheet included in this section for guidance in monitoring the toe drains and for additional information.

4. Monitor the condition of the toe drain outlet pipes. See the "Problems with Metal Materials" fact sheet included in this section for additional information.

Val A. Zampedro 7/25/07

Val A. Zampedro Date
Project Engineer
Dam Safety Engineering Program
Division of Water

Keith R. Banachowski July 25, 2007

Keith R. Banachowski, P.E. Date
Program Manager
On behalf of Deborah F. Hoffman, Chief
Division of Water

This inspection was performed pursuant to the authority granted to the Chief of the Division of Water in ORC Section 1521.062.

Ohio Department of Natural Resources

BOB TAFT, GOVERNOR SAMUEL W. SPECK, DIRECTOR

James R. Morris • Chief

Division of Water

April 4, 2003

Mr. Terry Courtney,
Secretary-Treasurer
Hocking Conservancy District
560 West Union Street
Athens, OH 45701-2331

RE: Margaret Creek Structures No. 1, 4, 5 and 6
Athens County
File Numbers: 9121-008, 9220-003, 9220-002, and 9221-001

Dear Mr. Courtney:

On March 5, 2003, the Division of Water, Dam Safety Engineering Program, received emergency action plans for Margaret Creek Structures No. 1, 4, 5, and 6. We have completed our review of the submitted information and have the following comments.

1. Inundation maps showing the effect of the Design Flood and the Design Flood plus failure of the dams must be included.

2. On Page C-1 of the plans, it indicates the Margaret Creek Conservancy District maintains a list of local contractors and sources of construction repair materials. Please include this list in the emergency action plans.

3. Actions to be taken during periods of darkness, and alternate means of communication must be included.

4. On Page 8 of the plans, the area code for the ODNR, Division of Water is incorrect. It should be 614.

Please make revisions in accordance with the above comments. The emergency action plans must be resubmitted for review. If you should have any questions or would like to schedule a meeting to discuss your emergency action plans, please contact me at 614/265-6760.

Sincerely,

Val A. Zampedro

Val A. Zampedro, P.E.
Project Engineer
Dam Safety Engineering Program
Division of Water

Ohio Department of Natural Resources
Division of Water Fact Sheet

Fact Sheet 99–54

Dam Safety: Ground Cover

The establishment and control of proper vegetation are an important part of dam maintenance. Properly maintained vegetation can help prevent erosion of embankment and earth channel surfaces, and aid in the control of groundhogs and muskrats. The uncontrolled growth of vegetation can damage embankments and concrete structures and make close inspection difficult.

Grass vegetation is an effective and inexpensive way to prevent erosion of embankment surfaces. If properly maintained, it also enhances the appearance of the dam and provides a surface that can be easily inspected. Roots and stems tend to trap fine sand and soil particles, forming an erosion-resistant layer once the plants are well established. Grass vegetation may not be effective in areas of concentrated runoff, such as at the contact of the embankment and abutments, or in areas subjected to wave action.

Common Problems

Bare Areas

Bare areas on an embankment are void of protective cover (e.g. grass, asphalt, riprap etc.). They are more susceptible to erosion which can lead to localized stability problems such as small slides and sloughs. Bare areas must be repaired by establishing a proper grass cover or by installing other protective cover. If using grass, the topsoil must be prepared with fertilizer and then scarified before sowing seed. Types of grass vegetation that have been used on dams in Ohio are bluegrass, fescue, ryegrass, alfalfa, clover, and redtop. One suggested seed mixture is 30% Kentucky Bluegrass, 60% Kentucky 31 Fescue, and 10% Perennial Ryegrass. Once the seed is sown, the area should be mulched and watered regularly.

Erosion

Embankment slopes are normally designed and constructed so that the surface drainage will be spread out in a thin layer as "sheet flow" over the grass cover. When the sod is in poor condition or flow is concentrated at one or more locations, the resulting erosion will leave rills and gullies in the embankment slope. The erosion will cause loss of material and make maintenance of the embankment difficult. Prompt repair of the erosion is required to prevent more serious damage to the embankment. If erosion gullies are extensive, a registered professional engineer may be required to design a more rigid repair such as riprap or concrete. Minor rills and gullies can be repaired by filling them with compacted cohesive material. Topsoil should be a minimum of 4 inches deep. The area should then be seeded and mulched. Not only should the eroded areas be repaired, but the cause of the erosion should be addressed to prevent a continued maintenance problem.

Footpaths

Paths from animal and pedestrian traffic are problems common to many embankments. If a path has become established, vegetation in this area will not provide adequate protection and a more durable cover will be required unless the traffic is eliminated. Gravel, asphalt, and concrete have been used effectively to cover footpaths. Embedding railroad ties or other treated wood beams into an embankment slope to form steps is one of the most successful and inexpensive methods used to provide a protected pathway.

Vehicle Ruts

Vehicle ruts can also be a problem on the embankment. Vehicular traffic on the dam should be discouraged especially during wet conditions except when necessary. Water collected in ruts may cause localized saturation, thereby weakening the embankment. Vehicles can also severely damage the vegetation on embankments. Worn areas could lead to erosion and more serious problems. Ruts that develop in the crest should be repaired by grading to direct all surface drainage into the impoundment. Bare and eroded areas should be repaired using the methods mentioned in the above sections. Constructed barriers such as fences and gates are effective ways to limit access of vehicles.

Improper Vegetation

Crown vetch, a perennial plant with small pink flowers, has been used on some dams in Ohio but is not recommended (see Figure 1). It hides the embankment surface, preventing early detection of cracks and erosion. It is not effective in preventing erosion.

Continued on back!

Figure 1: Crown Vetch
(Source: http://www.vg.com)

Vines and woody vegetation such as trees and brush also hide the embankment surface preventing early detection of cracks and erosion. Tall vegetation also provides a habitat for burrowing animals. All improper vegetation must be removed from the entire embankment surface. Any residual roots that are larger than 3 inches in diameter must be removed. All roots should be removed down to a depth of at least 6 inches and replaced with a compacted clay material; then 4 inches of topsoil should be placed on the disturbed areas of the slope. Finally, these areas must be seeded and mulched to establish a proper grass cover.

Maintenance

Embankments, areas adjacent to spillway structures, vegetated channels, and other areas associated with a dam require continual maintenance of the vegetal cover. Removal of improper vegetation is necessary for the proper maintenance of a dam, dike or levee. All embankment slopes and vegetated earth spillways should be mowed at least twice a year. Reasons for proper maintenance of the vegetal cover include unobstructed viewing during inspection, maintenance of a non-erodible surface, discouragement of burrowing animal habitation, and aesthetics.

Common methods for control of vegetation include the use of weed trimmers or power brush-cutters and mowers. Chemical spraying to kill small trees and brush is acceptable if precautions are taken to protect the local environment. Some chemical spraying may require proper training prior to application. Additional information can be found on the Trees and Brush Fact Sheet.

Any other questions, comments concerns, or fact sheet requests, should be directed to the Division of Water at the following address:

Ohio Department of Natural Resources
Division of Water
Dam Safety Engineering Program
2045 Morse Road
Columbus, Ohio 43229-6693
Voice: (614) 265-6731 Fax: (614) 447-9503
Website: http://www.dnr.state.oh.us/water

Ohio Department of Natural Resources
Division of Water Fact Sheet

Fact Sheet 94–28

Dam Safety: Trees and Brush

The establishment and control of proper vegetation is an important part of dam maintenance. Properly maintained vegetation can help prevent erosion of embankment and earth channel surfaces, and aid in the control of groundhogs and muskrats. The uncontrolled growth of vegetation can damage embankments and concrete structures and make close inspection difficult.

Trees and Brush

Trees and brush should not be permitted on embankment surfaces or in vegetated earth spillways. Extensive root systems can provide seepage paths for water. Trees that blow down or fall over can leave large holes in the embankment surface that will weaken the embankment and can lead to increased erosion. Brush obscures the surface limiting visual inspection, provides a haven for burrowing animals, and retards growth of grass vegetation. Tree and brush growth adjacent to concrete walls and structures may eventually cause damage to the concrete and should be removed.

Stump Removal & Sprout Prevention

Stumps of cut trees should be removed so vegetation can be established and the surface mowed. Stumps can be removed either by pulling or with machines that grind them down. All woody material should be removed to about 6 inches below the ground surface. The cavity should be filled with well-compacted soil and grass vegetation established.

Stumps of trees in riprap cannot usually be pulled or ground down, but can be chemically treated so they will not continually form new sprouts. Certain herbicides are effective for this purpose and can even be used at water supply reservoirs if applied by licensed personnel. For product information and information on how to obtain a license, contact the Ohio Department of Agriculture at the following address:

Ohio Department of Agriculture
Pesticide Regulation
8995 E. Main Street
Reynoldsburg, Ohio 43068
Telephone Number (614) 728-6987

These products should be painted, not sprayed, on the stumps. Other instructions found on the label should be strictly followed when handling and applying these materials. Only a few commercially available chemicals can be used along shorelines or near water.

Embankment Maintenance

Embankments, areas adjacent to spillway structures, vegetated channels, and other areas associated with a dam require continual maintenance of the vegetal cover. Grass mowing, brush cutting, and removal of woody vegetation (including trees) are necessary for the proper maintenance of a dam, dike, or levee. All embankment slopes and vegetated earth spillways should be mowed at least twice per year. Aesthetics, unobstructed viewing during inspections, maintenance of a non-erodible surface, and discouragement of groundhog habitation are reasons for proper maintenance of the vegetal cover.

Methods used in the past for control of vegetation, but are now considered unacceptable, include chemical spraying, and burning. More acceptable methods include the use of weed whips or power brush-cutters and mowers. Chemical spraying to first kill small trees and brush is acceptable if precautions are taken to protect the local environment.

It is important to remember not to mow when the embankment is wet. It is also important to use proper equipment for the slope and type of vegetation to be cut. Also, always follow the manufacturer's recommended safe operation procedures.

Any other questions, comments, concerns, or fact sheet requests, should be directed to the Division of Water at the following address:

Ohio Department of Natural Resources
Division of Water
Dam Safety Engineering Program
2045 Morse Road
Columbus, Ohio 43229-6693
Voice: (614) 265-6731 Fax: (614) 447-9503
Website: http://www.dnr.state.oh.us/water

Ohio Department of Natural Resources
Division of Water Fact Sheet

Fact Sheet 94-31

Dam Safety: Seepage Through Earthen Dams

Contrary to popular opinion, wet areas down stream from dams are not usually natural springs, but seepage areas. Even if natural springs exist, they should be treated with suspicion and carefully observed. Flows from ground-water springs in existence prior to the reservoir would probably increase due to the pressure caused by the pool of water behind the dam.

All dams have some seepage as the impounded water seeks paths of least resistance through the dam and its foundation. Seepage must, however, be controlled to prevent erosion of the embankment or foundation or damage to concrete structures.

Detection

Seepage can emerge anywhere on the downstream face, beyond the toe, or on the downstream abutments at elevations below normal pool. Seepage may vary in appearance from a "soft," wet area to a flowing "spring." It may show up first as an area where the vegetation is lush and darker green. Cattails, reeds, mosses, and other marsh vegetation often become established in a seepage area. Another indication of seepage is the presence of rust-colored iron bacteria. Due to their nature, the bacteria are found more often where water is discharging from the ground than in surface water. Seepage can make inspection and maintenance difficult. It can also saturate and weaken portions of the embankment and foundation, making the embankment susceptible to earth slides.

If the seepage forces are large enough, soil will be eroded from the foundation and be deposited in the shape of a cone around the outlet. If these "boils" appear, professional advice should be sought immediately. Seepage flow which is muddy and carrying sediment (soil particles) is evidence of "piping," and will cause failure of the dam. Piping can occur along a spillway and other conduits through the embankment, and these areas should be closely inspected. Sinkholes may develop on the surface of the embankment as internal erosion takes place. A whirlpool in the lake surface may follow and then likely a rapid and complete failure of the dam. Emergency procedures, including downstream evacuation, should be implemented if this condition is noted.

Seepage can also develop behind or beneath concrete structures such as chute spillways or headwalls. If the concrete structure does not have a means such as weep holes or relief drains to relieve the water pressure, the concrete structure may heave, rotate, or crack. The effects of the freezing and thawing can amplify these problems. It should be noted that the water pressure behind or beneath structures may also be due to infiltration of surface water or spillway discharge.

A continuous or sudden drop in the normal lake level is another indication that seepage is occurring. In this case, one or more locations of flowing water are usually noted downstream from the dam. This condition, in itself, may not be a serious problem, but will require frequent and close monitoring and professional assistance.

Control

The need for seepage control will depend on the quantity, content, and location of the seepage. Reducing the quantity of seepage that occurs after construction is difficult and expensive. It is not usually attempted unless the seepage has lowered the pool level or is endangering the embankment or appurtenant structures. Typical methods used to control the quantity of seepage are grouting or installation of an upstream blanket. Of these methods, grouting is probably the least effective and is most applicable to leakage zones in bedrock, abutments, and foundations. These methods must be designed and constructed under the supervision of a professional engineer experienced with dams.

Continued on back!

Controlling the content of the seepage or preventing seepage flow from removing soil particles is extremely important. Modern design practice incorporates this control into the embankment through the use of cut-offs, internal filters, and adequate drainage provisions. Control at points of seepage exit can be accomplished after construction by installation of toe drains, relief wells, or inverted filters.

Weep holes and relief drains can be installed to relieve water pressure or drain seepage from behind or beneath concrete structures. These systems must be designed to prevent migration of soil particles but still allow the seepage to drain freely. The owner must retain a professional engineer to design toe drains, relief wells, inverted filters, weep holes, or relief holes.

Monitoring

Regular monitoring is essential to detect seepage and prevent dam failure. Knowledge of the dam's history is important to determine whether the seepage condition is in a steady or changing state. It is important to keep written records of points of seepage exit, quantity and content of flow, size of wet area, and type of vegetation for later comparison. Photographs provide invaluable records of seepage.

All records should be kept in the operation, maintenance, and inspection manual for the dam. The inspector should always look for increases in flow and evidence of flow carrying soil particles, which would indicate that a more serious problem is developing. Instrumentation can also be used to monitor seepage. V-notch weirs can be used to measure flow rates, and piezometers may be used to determine the saturation level (phreatic surface) within the embankment.

Regular surveillance and maintenance of internal embankment and foundation drainage outlets is also required. The rate and content of flow from each pipe outlet for toe drains, relief wells, weep holes, and relief drains should be monitored and documented regularly. Normal maintenance consists of removing all obstructions from the pipe to allow for free drainage of water from the pipe. Typical obstructions include debris, gravel, sediment, and rodent nests. Water should not be permitted to submerge the pipe outlets for extended periods of time. This will inhibit inspection and maintenance of the drains and may cause them to clog.

Any other questions, comments concerns, or fact sheet requests, should be directed to the Division of Water at the following address:

Ohio Department of Natural Resources
Division of Water
Dam Safety Engineering Program
2045 Morse Road
Columbus, Ohio 43229-6605
Voice: (614) 265-6731 Fax: (614) 447-9503
Website: http://www.dnr.state.oh.us/water

Ohio Department of Natural Resources
Division of Water Fact Sheet

Fact Sheet 99–57

Dam Safety: Problems with Metal Materials

Corrosion is a common problem for spillway conduits and other metal appurtenances. Corrosion is the deterioration or breakdown of metal because of a reaction with its environment. Exposure to moisture, acidic conditions, or salt will accelerate the corrosion process. Acid runoff from strip-mined areas will cause rapid corrosion of metal conduits. In these areas, conduits made of less corrodible materials such as concrete or plastic should be used. Soil types also factor into the amount of corrosion. Clayey soils can be more corrosive than sandy soils since they are poorly drained and poorly aerated. Silts are somewhere in between clays and sands. Some examples of metal conduits include ductile iron, smooth steel, and corrugated metal. Corrugated metal pipe is not recommended for use in dams since the service life for corrugated metal is only 25 to 30 years, whereas the life expectancy for dams is much longer. In areas of acidic water, the service life can be much less. Therefore, corrugated metal spillway conduits typically need to be repaired or replaced early in the dam's design life, which can be very expensive.

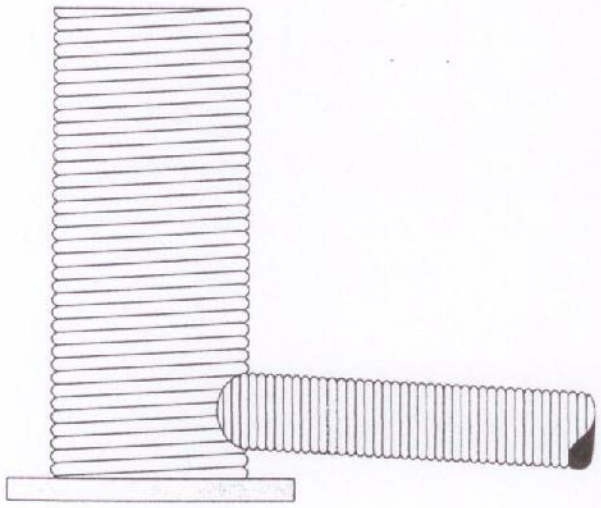


Figure 1 – Example of a corrugated metal pipe and riser spillway.

Conduit coating is an effective way of controlling corrosion of metal conduits if used properly. It is relatively inexpensive and extends the life of the conduit. Some examples of coatings include cement-mortar, epoxy, aluminum, or polyethylene film. Asphalt (bituminous) coatings are not recommended since their service life is usually only one or two years. Coatings must be applied to the conduit prior to installation and protected to ensure that the coating is not scratched off. Coatings applied to conduits in service are generally not very effective because of the difficulty in establishing an adequate bond.

Corrosion can also be controlled or arrested by installing cathodic protection. A metallic anode such as magnesium (or zinc) is buried in the soil and is connected to the metal conduit by wire. Natural voltage current flowing from the magnesium (anode) to the conduit (cathode) will cause the magnesium to corrode and not the conduit. However, sufficient maintenance funds should be allocated for the regular inspection of this active system.

If corrosion is allowed to continue, metal conduits will rust out. The spillway must be repaired before water flows through the rusted out portion of the conduit and erodes the fill material of the embankment. Continued erosion can lead to failure of the dam. Sliplining can be an economical and effective method of permanently restoring deteriorated spillways. During sliplining, a smaller diameter pipe is inserted into the old spillway conduit and then grout is used to fill in the void between the two pipes. If sliplining the spillway is not feasible, the lake may need to be drained and a new spillway must be installed. A registered professional engineer must be retained to develop and submit plans and specifications for any major modifications such as spillway sliplining or replacement.

Corrosion of the metal parts of the operating mechanisms such as lake drain valves and sluice gates can be effectively treated by keeping these parts lubricated and /or painted. If the device has not been operated in several years, a qualified person (i.e. manufacturer's representative or registered professional engineer) should inspect it to determine its

Continued on back!

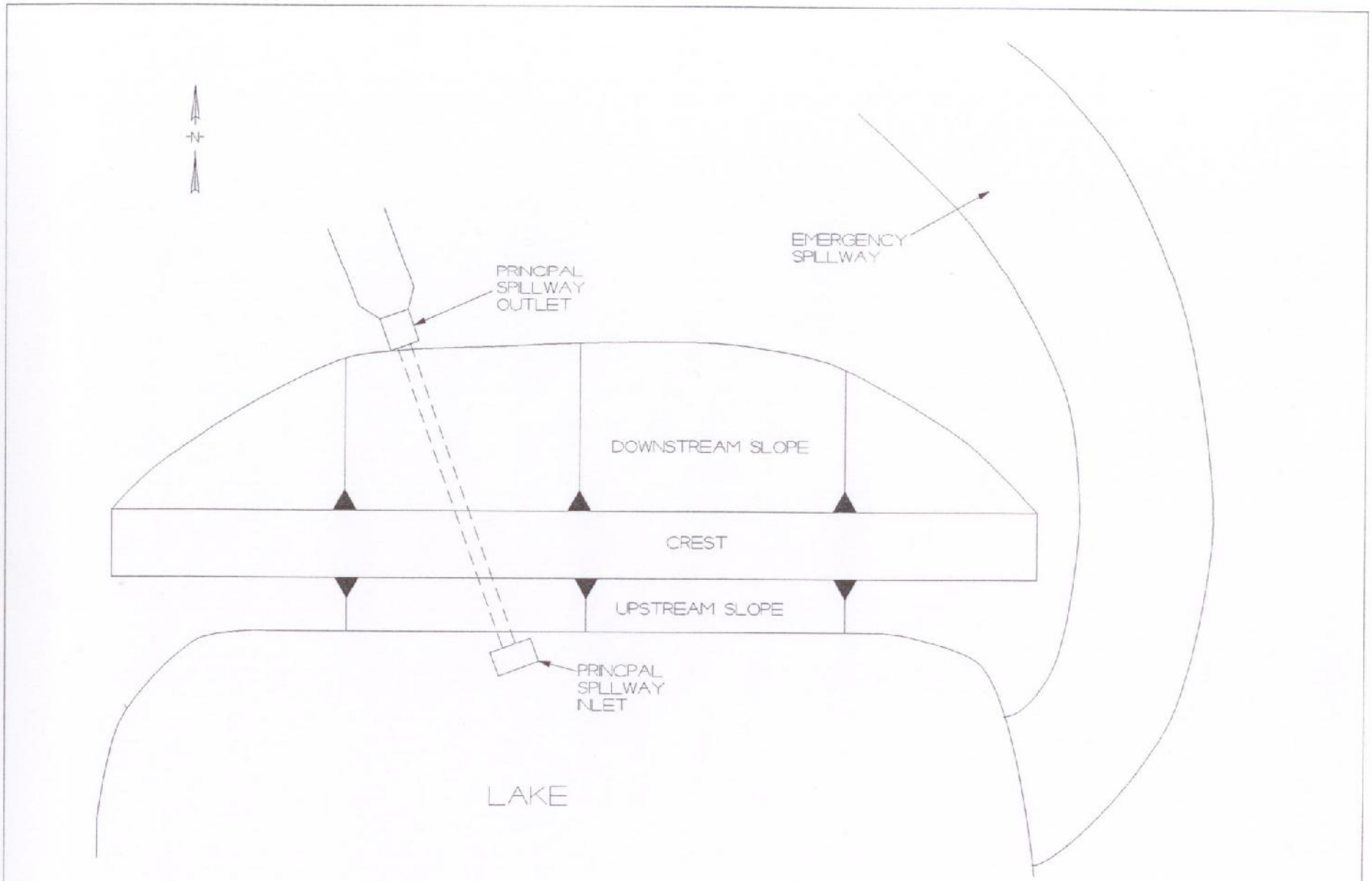
operability. Caution must be used to prevent the mechanism from breaking. A registered professional engineer may be needed to prepare plans and specifications for repair if the device is determined to be inoperable.

Regular inspection and monitoring is essential to detect any problems with metal materials. Coatings on metal pipes should be inspected for scratched and worn areas. The inspector should also look for corrosion inside the spillway conduit. Proper ventilation and confined space precautions must be considered when entering the spillway conduit system. If using cathodic protection, regular inspections are required to verify that the system is working properly. It is important to keep written records of the amount of surface rust, pitting, and corrosion on any metal surface. Areas of thin metal should be monitored more frequently and repaired or replaced if they rust out. Photographs provide invaluable records of changing conditions. A rapidly changing condition may indicate a very serious problem, and the Dam Safety Engineering Program should be contacted immediately. All records should be kept in the operation, maintenance, and inspection manual for the dam.

Any other questions, comments concerns, or fact sheet requests, should be directed to the Division of Water at the following address:

Ohio Department of Natural Resources
Division of Water
Dam Safety Engineering Program
1939 Fountain Square, Building E-3
Columbus, Ohio 43224-1336
(614) 265-6731 (Voice) (614) 447-9503 (Fax)
http://www.dnr.state.oh.us/water

Section 2

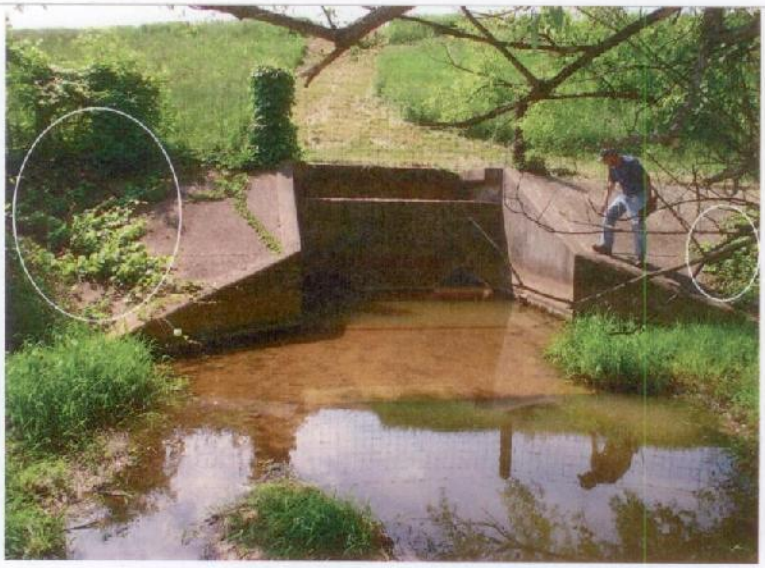


DAM SAFETY ENGINEERING PROGRAM	STATE OF OHIO DEPARTMENT OF NATURAL RESOURCES DIVISION OF WATER	MARGARET CREEK STRUCTURE NO. 1	DESIGNED BY: DRAWN BY: VAZ CHECKED BY: APPROVED BY:	FILE NO: 912-008 SCALE: NONE DATE: 6/14/07 REVISED:	DATE OF INSPECTION: MAY 23, 2007

Photograph No. 1: The upstream slope of the dam.

Photograph No. 2: The downstream slope of the dam.

Photograph No. 3: The principal spillway riser.



Photograph No. 4: The impact basin at the principal spillway outlet. Note the vegetation on the concrete surfaces.

Photograph No. 5: The toe drain outlet on the right side of the impact basin. Note the rusted out invert.

Photograph No. 6: The emergency spillway channel looking downstream.

Dam Classification Checklist

Name of Dam:	Margaret Creek Structure No. 1			File Number:	9121-008
County:	Athens	Date:	May 23, 2007	Engineer:	VAZ

The classification of a dam is based on three factors: the dam's height, storage capacity, and potential downstream hazard. The height of the dam is the vertical distance from the crest to the downstream toe. The storage capacity is the volume of water that the dam can impound at the top of dam (crest) elevation. The downstream hazard consists of roads, buildings, homes, and other structures that would be damaged in the event of a dam failure. Potential for loss of life is also evaluated. Various dam failure scenarios must be considered, and they include failures when the dam is at normal pool level and failures during significant flood events. Each of the three factors is evaluated, and the final classification of the dam is based on the highest individual factor. Class I is the highest and Class IV is the lowest. The classification of a dam can change based on future development along the downstream channel.

This checklist is intended to establish or verify the appropriate classification in accordance with the Ohio Administrative Code – it does not necessarily show all potential hazards or the full extent of inundation. In addition, elevations are estimated.

HEIGHT CLASSIFICATION	***STORAGE CLASSIFICATION***	***EXEMPT~NON-REGULATED***
Dam Height = 31.5 feet	Stor. Capacity (top of dam)= 1000.8 acre-feet	
_____ > 60' - Class I	_____ > 5000 acre-feet - Class I	_____ Height ≤ 6 feet
_____ > 40' - Class II	X > 500 acre-feet - Class II	_____ Storage ≤ 15 acre-feet
X > 25' - Class III	_____ > 50 acre-feet - Class III	_____ 6 ft. < Height < 10 ft. &
_____ ≤ 25' - Class IV	_____ ≤ 50 acre-feet - Class IV	Stor. ≤ 50 ac-ft

Height Class: III

Storage Class: II

Hazard Class (see next page): I **Estimated Population at Risk:** (none 1-5 6-15 16+)

Final Class: I

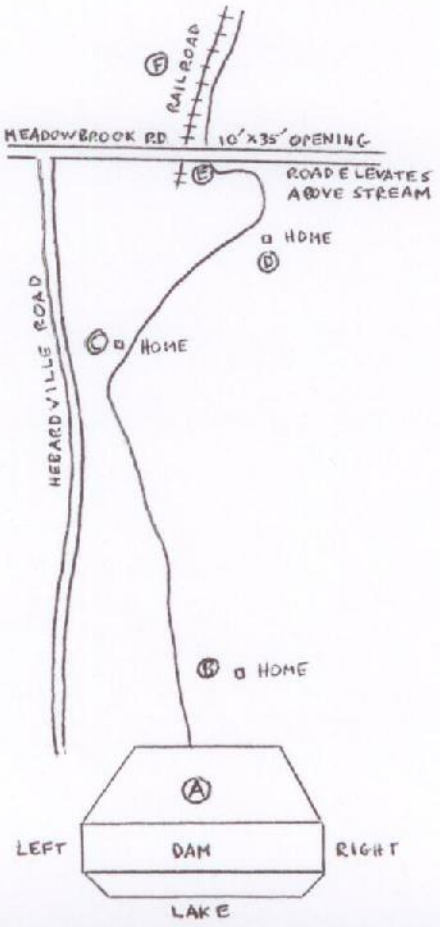
Class Changed (Yes, No)

POTENTIAL DOWNSTREAM HAZARD

I	II					III		IV	-	-			
Probable loss of human life	Loss of public water supply or wastewater treatment facility, release of health hazardous waste	Flooding of structure or high-value property	Damage to high-value or Class I, II, III dam or levee	Damage to major road (US or state route), disruption of only access to residential or critical facility area	Damage to railroad or public utility	Damage to rural building, not otherwise high-valued property, or Class IV dam or levee	Damage to local road (county and township)	Loss restricted mainly to the dam or agricultural /rural land	No hazard to structure noted	*No hazard assessment; further investigation needed*	Distance downstream of dam to affected structure (feet)	Vertical distance from streambed to base of affected structure (feet)	Horizontal distance from stream to affected structure (feet)
								A			1	1	1
B											350	10	175
C											1200	8-10	40
D											3500	12	100
							E				4000	6	0
					F						4000	8	50

This checklist is intended to establish or verify the appropriate classification in accordance with the OAC – it does not necessarily show all potential hazards or the full extent of inundation.

Sketch of Developments Downstream of Dam



Margaret Creek Structure No. 1, File Number: 9121-008, Inspected: May 23, 2007, VAZ

Flood Routing Summary

A dam must be able to safely pass severe flood events. A dam uses a combination of reservoir storage capacity and spillway discharge to prevent floodwater from overtopping the embankment crest. As part of this inspection, the Division of Water did not thoroughly investigate the ability of this dam to safely pass the required design flood. In 1990 the Division of Water performed hydrologic and hydraulic calculations to estimate the size of the design flood and the total spillway discharge capacity of the dam. These calculations combined with the reservoir storage capacity were used in the flood routings to determine the maximum water surface elevation in the reservoir for various flood events (see Table I).

Margaret Creek Structure No. 1 is a Class I dam; therefore, in accordance with OAC Rule 1501:21-13-02, the required design flood is 100% of the Probable Maximum Flood (PMF) or the critical flood. This dam and its spillway system must safely pass the design flood without overtopping the embankment crest. Flood routing calculations indicate that the dam can pass 50% of the PMF; Margaret Creek Structure No. 1 does not appear to be able to safely pass the design flood.

Table I - Flood Routing Summary

Flood Event	Maximum Inflow (cubic feet per second)	Maximum WSEL* (feet)	Overtopping Depth** (feet)	Overtopping Duration (hours)
PMF	21980	725.4	1.9	1.3
75% PMF	16485	724.4	0.9	1.1
50% PMF	10990	722.8	-0.7	0
25% PMF	5495	720.1	-3.4	0
12% PMF***	2637	715.9	-7.6	0

* WSEL – water surface elevation, in feet above the mean sea level

** A negative number indicates that the dam does not overtop and represents the elevation difference between the Maximum WSEL and the Top of Dam Elevation (freeboard)

*** 12% PMF is similar to the 100-year flood. The 100-year flood event has a 1% chance of occurring in any given year. This is only an approximation.

Top of Dam Elevation: 723.50 feet above msl
Emergency Spillway Elevation: 717.00 feet above msl
Normal Pool Elevation: 705.00 feet above msl

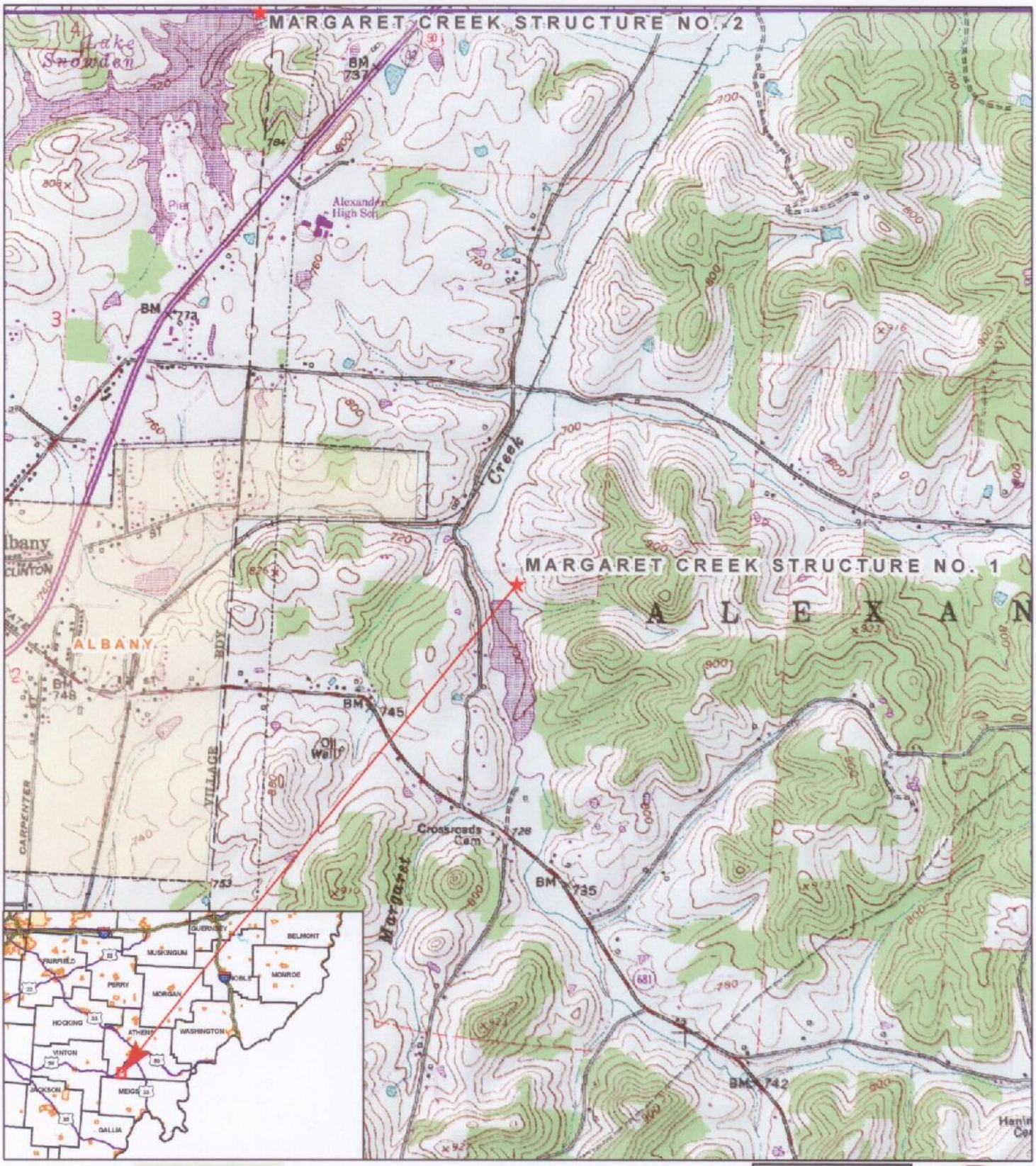
History of Margaret Creek Structure No. 1

Date	Event
1972	Dam constructed.
1979	Dam inventoried.
1990	Dam safety inspection by the Division of Water.
2001	Dam safety inspection by the Division of Water.
May 23, 2007	Dam safety inspection by the Division of Water.

Section 3

LOCATION MAP

MARGARET CREEK STRUCTURE NO. 1 - 9121-008



Mar 02, 2007

Dam Inventory Sheet

Name: MARGARET CREEK STRUCTURE NO. 1
File No: 9121-008
National #: OH00960
Reservoir: MEEKS LAKE
Permit No.: EXEMPT
Class: I

Owner Information

Owner: Hocking Conservancy District
Owner Type: Public, C.d.
Address: 560 West Union Street
Parcel No.:

City: Athens **State:** OH **Zip:** 45701-2331
Contact: Terry Courtney, Exec. Sec-Treas **Phone No.:** 740/592-1792

Location Information

County: Athens **Latitude Deg.:** 39 **Min.:** 13 **Sec.:** 33
Township: Alexander **Longitude Deg.:** 82 **Min.:** 10 **Sec.:** 33
Stream Margaret Creek
Nearest Affected Community: Fisher
Community's Distance from Dam (miles): 4.2
USGS Quad.: Albany **USGS Basin No.:** 05030204

Design/Construction Information

Designed By: Usda, Scs
Constructed By: Unknown
Completed: 1972 **Plan Available:** YES **At:** USDA, SCS
Failure/Incident/Breach:

Structure Information

Purpose: Flood Control, C.d.
Type of Impound.: Dam And Spillway
Type of Structure: Earthfill
Drainage Area (sq. miles): 3.42 **or (acres):** 2234

Embankment Data

Length (ft): 665 **Upstream Slope:** 3H:1V
Height (ft): 31.5 **Downstream Slope:** 2.5H:1V
Top Width (ft): 20 **Volume of Fill (cub. yds.):** 36400

Spillway Outlet Works Data

Lake Drain: 12-INCH-DIAMETER PIPE
Principal: 36-INCH-DIAMETER CONCRETE PIPE W/3-FT X 9-FT SCS COVERED TOP RISER
Emergency: 120-FT-WIDE OPEN CHANNEL W/3H:1V SIDE SLOPES
Maximum Spillway Discharge (cfs) 12179.9 **Design Flood:** 1.0 **Flood Capacity** 0.50

Dam Reservoir Data	Elevation (ft-MSL)*	Area (acres)	Storage (acre-feet)
Top of Dam:	723.5	86	1000.8
Emergency Spillway:	717	57	493.2
Principal Spillway:	705	16	80.4
Streambed:	692		
Foundation:			

*Elevations are not necessarily related to a USGS benchmar

Inspection Information

Inspection History: 05/23/2007 VAZ
10/31/2001 MEM
09/12/1990

Phase I:
Other Visits: 11/13/84 INV, 6/12/79 INV

Operation Information/Remarks

PL-566 PROJECT

Emergency Action Plan: Yes **Format:** ICODS **OMI:** No
Annual Fee: $345.00 **Last Entry:** 07/23/2007

Dam Safety Inspection Checklist

Complete All Portions of This Section (Pre-inspection)

Name of Dam: Margaret Creek Structure No. 1

Athens County Required Action

Date of Inspection:

File Number: 9121-008

None	Mon.	Maint.	Eng.
☐	☐	☐	☒

Class: I Design Flood: 1.0 Flood Capacity: 0.50

Interview with Owner (at the site):

Owner/Representative present: (Yes) No) Name(s): Mark Holdcroft

Owner's Name(s): Hocking Conservancy District

Address: 560 West Union Street, ,

City: Athens State: OH Zip (+4): 45701-2331

Contact Person: Terry Courtney, Exec. Sec-Treas Telephone: 740/592-1792

Email Address:

Purpose of dam: Flood Control, C.d.

Owner Dam Safety Program

Emergency Action Plan

EAP (document): Yes ICODS Up-to-date? (yes, no) ☐ ☐ ☐ ☒

Exercised:

Downstream development: No recent changes.

Security: Gate on left abutment.

Operation, Maintenance, and Inspection

OMI (document): No Up-to-date? (yes, no) ☐ ☐ ☒ ☐

Operation of drains/gates

All operable? (yes, no) Operated annually.

Normal rate of drawdown: 4 to 5 inches overnight Emerg. rate of drawdown: Same as normal.

Accessibility for operation: From shore.

Maintenance

Frequency of mowing: Twice per year.

Other maintenance: Woody plants cut annually, rodent burrows filled as needed, toe drains monitored.

Inspection

Frequency and thoroughness of day-to-day & routine inspections: Monthly walk through.

Frequency and thoroughness of event-driven inspections: in response to rain events.

Problems found during inspections: None.

Field Information

Pool Elevation (during inspection): 6 inches above normal. Time: 11:00 (a.m.) p.m.)

Site Conditions(temp., weather, ground moisture): Sunny, 80°, dry

Inspection Party: Val Zampedro, Keith Banachowski

Maximum Height: 31.5 Feet (measured or inventory appears correct)

Normal Pool Surface Area: 16 Acres (measured or inventory appears correct)

Riser has 18-inch by 24-inch low-flow inlet at 705, and two 9-foot weirs at 713; Lake drain is cast iron pipe on upstream end of riser. Two toe drain outlets located in sides of impact basin by endsill. Based on 100-year flood estimate, PMF appears to be high (PMF = 20x 100-year).	PI-566 Project

UPSTREAM SLOPE

Gradient: Horizontal: 3 Vertical: 1 (est, meas.)

Action: None | Monitor | Maintenance | Engineer

☒ ***VEGETATION*** (no problem)

- ☐ Trees: Quantity: (<5, sparse, dense) ☐ ☐ ☐ ☐
  Diameter: (<6", 6-12", >12")
  Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
  Notes:
- ☐ Brush: Quantity: (sparse, dense) ☐ ☐ ☐ ☐
  Location:(adj. to structure, entire slope, lt end, rt end, middle, see dwg)
  Notes:
- ☒ Ground Cover: Type: (grass) crown vetch) Other: ☒ ☐ ☐ ☐
  Quantity: (bare, sparse, adequate, dense)
  Appearance: (too tall, too short, good)
  Notes:

☒ ***SLOPE PROTECTION*** (no problem) could not inspect thoroughly]

- ☐ None ☐ ☐ ☐ ☐
- ☒ Riprap: Average Diameter: 4 TO 6 INCHES ☒ ☐ ☐ ☐
  (adequate) sparse, displaced, weathered, vegetation) (bedding/fabric noted - yes, no)
  Notes:
- ☐ Wave Berm: ☐ ☐ ☐ ☐
  Vegetation: (adequate, bare, sparse, improper vegetation)
  Notes:
- ☐ Concrete Slabs: (cracked, settlement, undermined, voids, deteriorated, vegetation) ☐ ☐ ☐ ☐
  Notes:
- ☒ Other: A WAVE FENCE STRETCHES ACROSS THE LENGTH OF THE DAM TO HELP BREAK ☒ ☐ ☐ ☐
  Notes: WAVE ACTION.

☒ ***EROSION*** (no problem) could not inspect thoroughly]

- ☐ Wave Erosion (Beaching): Scarp: Length: Height: ☐ ☐ ☐ ☐
  Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
  Notes:
- ☐ Runoff Erosion (Gullies): Quantity: ☐ ☐ ☐ ☐
  Depth: Width: Length:
  Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
  Notes/Causes:

☒ ***INSTABILITIES*** (no problem) could not inspect thoroughly]

- ☐ Slides: Transverse Length: Longitudinal Length: ☐ ☐ ☐ ☐
  Scarp: Width: Length:
  Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
  Crack: Width: Depth:
  Notes/Causes
- ☐ Cracks: ☐ Transverse ☐ Longitudinal ☐ Other ☐ ☐ ☐ ☐
  Quantity: Length: Width: Depth:
  Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
  Notes/Causes:

None | Monitor | Maintenance | Engineer

Required Action

Required Action

None Monitor Maintenance Engineer

☐ Cracks: ☐ Transverse ☐ Longitudinal ☐ Other ☐ ☐ ☐ ☐
Quantity: Length: Width: Depth:
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes/Causes:

☐ Bulges ☐ Depressions ☐ Hummocky ☐ ☐ ☐ ☐
Size: Height: Depth:
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes/Causes:

☐ Bulges ☐ Depressions ☐ Hummocky ☐ ☐ ☐ ☐
Size: Height: Depth:
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes/Causes:

☒ ***OTHER*** (no problem) could not inspect thoroughly]
☐ Rodent Burrows: (few, numerous) ☐ ☐ ☐ ☐
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes:

☐ Ruts: ☐ ☐ ☐ ☐
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Depth: Width Length:
Notes/Causes: (truck/auto, motorcycle, ATV, animals, pedestrian)

☐ Other: ☐ ☐ ☐ ☐
Notes:

CREST

Length: 665 FEET Width: 20 FEET (est.) meas.)

☒ ***VEGETATION*** (no problem)
☐ Trees: Quantity: (<5, sparse, dense) ☐ ☐ ☐ ☐
Diameter: (<6", 6-12", >12")
Location: (adj. to structure, entire crest, lt end, rt end, middle, see dwg)
Notes:

☐ Brush: Quantity: (sparse, dense) ☐ ☐ ☐ ☐
Location: (adj. to structure, entire crest, lt end, rt end, middle, see dwg)
Notes:

☐ Ground Cover: Type: (grass, crown vetch) Other: ☐ ☐ ☐ ☐
Quantity: (bare, sparse, adequate, dense)
Appearance: (too tall, too short, good)
Notes:

☒ ***EROSION*** (no problem) could not inspect thoroughly]
☐ Runoff Erosion (Gullies): Quantity: Depth: Width: Length: ☐ ☐ ☐ ☐
Location: (adj. to structure, entire crest, lt end, rt end, middle, see dwg)
Notes/Causes:

None Monitor Maintenance Engineer

Required Action

Required Action

None | Monitor | Maintenance | Engineer

☒ ***ALIGNMENT*** (no problem) could not inspect thoroughly]

☐ Vertical: ☐ Low Area: ☐ ☐ ☐ ☐

Location: (adj. to structure, entire crest, lt end, rt end, middle, see dwg)

Elevation Difference: Length:

Notes/Causes:

☐ ☐ ☐ ☐

☐ Horizontal:

Notes/Causes:

☒ ***WIDTH*** (no problem)

☐ Too Narrow

Location: (adj. to structure, entire crest, lt end, rt end, middle, see dwg) ☐ ☐ ☐ ☐

Notes/Causes:

☒ ***INSTABILITIES*** (no problem) could not inspect thoroughly]

☐ Cracks: ☐ Transverse ☐ Longitudinal ☐ Other ☐ ☐ ☐ ☐

Quantity: Length: Width: Depth:

Location: (adj. to structure, entire crest, lt end, rt end, middle, see dwg)

Notes/Causes:

☐ Cracks: ☐ Transverse ☐ Longitudinal ☐ Other ☐ ☐ ☐ ☐

Quantity: Length: Width: Depth:

Location: (adj. to structure, entire crest, lt end, rt end, middle, see dwg)

Notes/Causes:

☐ Bulges ☐ Depressions ☐ Hummocky ☐ ☐ ☐ ☐

Size: Height: Depth:

Location: (adj. to structure, entire crest, lt end, rt end, middle, see dwg)

Notes/Causes:

☐ Bulges ☐ Depressions ☐ Hummocky ☐ ☐ ☐ ☐

Size: Height: Depth:

Location: (adj. to structure, entire crest, lt end, rt end, middle, see dwg)

Notes/Causes:

☒ ***OTHER*** (no problem) could not inspect thoroughly]

☐ Rodent Burrows: (few, numerous) ☐ ☐ ☐ ☐

Location: (adj. to structure, entire crest, lt end, rt end, middle, see dwg)

Notes:

☐ Ruts: ☐ ☐ ☐ ☐

Location: (adj. to structure, entire crest, lt end, rt end, middle, see dwg)

Depth: Width Length:

Notes/Causes: (truck/auto, motorcycle, ATV, animals, pedestrian)

☐ Other: ☐ ☐ ☐ ☐

Notes:

None | Monitor | Maintenance | Engineer

Required Action

Required Action

DOWNSTREAM SLOPE Gradient: Horizontal: 2.5 Vertical: 1 (est. meas.)

None Monitor Maintenance Engineer

☒ ***VEGETATION*** [no problem]

☐ Trees: Quantity: (<5, sparse, dense) ☐ ☐ ☐ ☐
Diameter: (<6", 6-12", >12")
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes:

☐ Brush: Quantity: (sparse, dense) ☐ ☐ ☐ ☐
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes:

☒ Ground Cover: Type: (grass) crown vetch) Other: ☐ ☐ ☒ ☐
Quantity: (bare, sparse, adequate, (dense))
Appearance: (too tall) too short, good)
Notes:

☒ ***EROSION*** (no problem) could not inspect thoroughly]

☐ Runoff Erosion (Gullies): Quantity: Depth: Width: Length: ☐ ☐ ☐ ☐
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes/Causes:

☒ ***INSTABILITIES*** (no problem) could not inspect thoroughly]

☐ Slides: Transverse Length: Longitudinal Length: ☐ ☐ ☐ ☐
Scarp: Width: Length:
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Crack: Width: Depth:
Notes/Causes:

☐ Cracks: ☐ Transverse ☐ Longitudinal ☐ Other ☐ ☐ ☐ ☐
Quantity: Length: Width: Depth:
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes/Causes:

☐ Cracks: ☐ Transverse ☐ Longitudinal ☐ Other ☐ ☐ ☐ ☐
Quantity: Length: Width: Depth:
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes/Causes:

☐ Bulges ☐ Depressions ☐ Hummocky ☐ ☐ ☐ ☐
Size: Height: Depth:
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes/Causes:

☐ Bulges ☐ Depressions ☐ Hummocky ☐ ☐ ☐ ☐
Size: Height: Depth:
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes/Causes:

None Monitor Maintenance Engineer

Required Action

Required Action

None Monitor Maintenance Engineer

☒ ***OTHER*** (no problem) could not inspect thoroughly] ☐ ☐ ☐ ☐

☐ Rodent Burrows: (few, numerous)
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Notes:

☐ ☐ ☐ ☐

☐ Ruts:
Location: (adj. to structure, entire slope, lt end, rt end, middle, see dwg)
Depth: Width Length:
Notes/Causes: (truck/auto, motorcycle, ATV, animals, pedestrian)

☐ ☐ ☐ ☐

☐ Other:
Notes:

☒ ***SEEPAGE*** (no problem) could not inspect thoroughly] ☐ ☐ ☐ ☐

☐ Wet Area ☐ Flow ☐ Boil ☐ Sinkhole
Flow Rate Size:
Location:
☐ Aquatic Vegetation ☐ None
☐ Rust Colored Deposits ☐ None
☐ Sediment in Flow ☐ None
☐ Other:
Notes/Causes:

☐ ☐ ☐ ☐

☐ Wet Area ☐ Flow ☐ Boil ☐ Sinkhole
Flow Rate Size:
Location:
☐ Aquatic Vegetation ☐ None
☐ Rust Colored Deposits ☐ None
☐ Sediment in Flow ☐ None
☐ Other:
Notes/Causes:

☒ ***EMBANKMENT DRAINS*** [none, none found, no problem, could not inspect thoroughly] ☐ ☒ ☒ ☐

Type: ☒ Toe Drain ☐ Relief Wells ☐ Other:
Flow Rate: appeared to be none Size: 6" Number: 2
Location: SIDES OF IMPACT BASIN BY ENDSILL
Notes: INVERTS RUSTED OUT.
NEED TO BE CLEANED OUT DURING DRY PERIOD.

☒ ***MONITORING INSTRUMENTATION*** (none) none found, no problem, could not inspect thoroughly] ☐ ☐ ☐ ☐

☐ None Found ☐ Piezometers ☐ Weirs/Flumes ☐ Other
☐ Periodic Inspections by:
Notes:

None Monitor Maintenance Engineer
Required Action

Required Action

PRINCIPAL SPILLWAY

☒ *GENERAL INLET* (no problem) could not inspect thoroughly] ☐ ☐ ☐ ☐

☐ Anti-Vortex Plate [None] Dimensions: (adequate, too small,)

Type: (steel, concrete, aluminum, stainless steel, corrugated metal, wood, other):

Deterioration: (missing sections, rusted, collapsed)

Notes:

☐ Flash Boards [None] ☐ ☐ ☐ ☐

Type: (metal, wood):

Deterioration:

Notes:

☒ Trashrack [None] Opening Size: 1FT. (adequate) too small, too large) ☒ ☐ ☐ ☐

Type: (metal bars, fence, screen, concrete, baffle, other):

Deterioration: (broken bars, missing sections, rusted, collapsed)

Notes:

☒ *INLET OBSTRUCTION* (no problem) could not inspect thoroughly] ☐ ☐ ☐ ☐

☐ Debris: (leaves, trash, logs, branches, ice) ☐ ☐ ☐ ☐

☐ Trees: Quantity: (<5, sparse, dense)

Diameter: (<6", 6-12", >12")

Location: (entire inlet, lt side, rt side, middle, see dwg)

Notes:

☐ Brush: Quantity: (sparse, dense) ☐ ☐ ☐ ☐

Location: (entire inlet, lt side, rt side, middle, see dwg)

Notes:

☐ Other:(beaver activity, trashrack opening too small, partially/completely blocked, i.e.) ☐ ☐ ☐ ☐

Notes:

☒ *INLET MATERIALS* [no problem, could not inspect thoroughly]

☐ Metal

(loss of coating/paint, surface rust, corrosion (pitting, scaling), rusted out, pipe deformation) ☐ ☐ ☐ ☐

Dimensions:

Location:

Notes/Causes:

☒ Concrete

(bug holes, hairline crack, efflorescence) ☐ ☐ ☐ ☐

(spalling, popouts, honeycombing, scaling, craze/map cracks) ☐ ☐ ☐ ☐

(isolated crack, exposed rebar, disintegration, other) ☒ ☐ ☐ ☐

Dimensions/Location:

Notes/Causes: GENERALLY GOOD CONDITION

(bug holes, hairline crack, efflorescence) ☐ ☐ ☐ ☐

(spalling, popouts, honeycombing, scaling, craze/map cracks) ☐ ☐ ☐ ☐

(isolated crack, exposed rebar, disintegration, other) ☐ ☐ ☐ ☐

Dimensions/Location:

Notes/Causes:

☐ Plastic ☐ ☐ ☐ ☐

(deterioration, cracking, deformation)

Dimensions:

Location:

Notes/Causes:

Required Action

None Monitor Maintenance Engineer

☒ ***OTHER INLET PROBLEMS*** [no problem] could not inspect thoroughly]

☐ Mis-Alignment:(pipe, chute, sidewall, headwall) ☐ Pipe Deformation ☐ ☐ ☐ ☐

Location/Description:

Notes/Causes: **Required Action**

☐ Separated Joint ☐ Loss of Joint Material ☐ ☐ ☐ ☐

Location/Description:

Notes/Causes:

☐ Undermining: ☐ ☐ ☐ ☐

Location/Description:

Notes/Causes:

☐ Other: ☐ ☐ ☐ ☐

☒ ***OUTLET OBSTRUCTION*** [no problem] could not inspect thoroughly]

☐ Debris: (leaves, trash, logs, branches, ice) ☐ ☐ ☐ ☐

☐ Trees: Quantity: (<5, sparse, dense) Diameter: (<6", 6-12", >12") ☐ ☐ ☐ ☐

Location: (entire outlet, lt side, rt side, middle, see dwg)

Notes:

☐ Brush: Quantity: (sparse, dense) ☐ ☐ ☐ ☐

Location:(entire outlet, lt side, rt side, middle, see dwg)

Notes:

☐ Other:(beaver activity, trashrack opening too small, partially/completely blocked, i.e.) ☐ ☐ ☐ ☐

Notes:

☒ ***OUTLET MATERIALS*** [no problem, could not inspect thoroughly]

☐ Metal (loss of coating/paint, surface rust, corrosion (pitting, scaling), rusted out, pipe deformation) ☐ ☐ ☐ ☐

Dimensions:

Location:

Notes/Causes:

☒ Concrete (bug holes, hairline crack, efflorescence) ☐ ☐ ☐ ☐

(spalling, popouts, honeycombing, scaling, craze/map cracks) ☐ ☐ ☐ ☐

(isolated crack, exposed rebar, disintegration, other) ☐ ☐ ☐ ☐

Dimensions/Location:

Notes/Causes: GENERALLY GOOD CONDITION.

(bug holes, hairline crack, efflorescence) ☐ ☐ ☐ ☐

(spalling, popouts, honeycombing, scaling, craze/map cracks) ☐ ☐ ☐ ☐

(isolated crack, exposed rebar, disintegration, other) ☐ ☐ ☐ ☐

Dimensions/Location:

Notes/Causes:

☐ Plastic (deterioration, cracking, deformation) ☐ ☐ ☐ ☐

Dimensions:

Location:

Notes/Causes:

☐ Other: ☐ ☐ ☐ ☐

☒ ***OTHER OUTLET PROBLEMS*** [no problem, could not inspect thoroughly] ☐ ☐ ☐ ☐

☐ Mis-Alignment:(pipe, chute, sidewall, headwall) ☐ Pipe Deformation

Location/Description:

Notes/Causes:

None Monitor Maintenance Engineer **Required Action**

None Monitor Maintenance Engineer

☐ Separated Joint ☐ Loss of Joint Material ☐ ☐ ☐ ☐
Location/Description:
Notes/Causes: Required Action

☐ Undermining: ☐ ☐ ☐ ☐
Location/Description:
Notes/Causes:

☐ Other: ☐ ☐ ☐ ☐

OUTLET EROSION CONTROL STRUCTURE (Stilling Basins)

☐ None ☐ ☐ ☐ ☐
☒ (endwall/headwall, plunge pool, impact basin, flip bucket, USBR, baffled chute, rock lined channel) ☒ ☐ ☐ ☐
Notes:

Components (baffle blocks, chute blocks, endsill)

☒ *MATERIAL* [no problem, could not inspect thoroughly]
☐ Riprap: Average Diameter: ☐ ☐ ☐ ☐
(adequate, sparse, displaced, weathered, vegetation) (bedding/fabric noted - yes, no)
Notes:

☐ Concrete
(bug holes, hairline crack, efflorescence) ☐ ☐ ☐ ☐
(spalling, popouts, honeycombing, scaling, craze/map cracks) ☐ ☐ ☐ ☐
(isolated crack, exposed rebar, disintegration, other) ☐ ☐ ☐ ☐
Dimensions/Location:
Notes/Causes:

(bug holes, hairline crack, efflorescence) ☐ ☐ ☐ ☐
(spalling, popouts, honeycombing, scaling, craze/map cracks) ☐ ☐ ☐ ☐
(isolated crack, exposed rebar, disintegration, other) ☐ ☐ ☐ ☐
Dimensions/Location:
Notes/Causes:

☒ *OTHER* [no problem, could not inspect thoroughly] ☐ ☐ ☐ ☐
☐ Mis-Alignment:(sidewall, headwall, entire struct.)
Location:
Description:
Notes/Causes:

☐ Separated Joint ☐ Loss of Joint Material ☐ ☐ ☐ ☐
Location:
Description:
Notes/Causes:

☐ Undermining: ☐ ☐ ☐ ☐
Location:
Description:
Notes/Causes:

☒ Other: VEGETATION ON CONCRETE ☐ ☐ ☒ ☐

Required Action

☒ *DRAINS* (none) none found, no problem, could not inspect thoroughly] (See *SEEPAGE* Section for Toe Drains & Relief Wells)
Type: ☐ Weep Holes ☐ Relief Drains ☐ Other: ☐ ☐ ☐ ☐
Flow Rate: Size: Number:
Location:
Notes:

None Monitor Maintenance Engineer